

Claims

1. A magnetic recording medium, comprising a substrate and a first magnetic layer, wherein the first magnetic layer comprises (a) a continuous matrix comprising at least one or more components and (b) a portion that is different from the matrix, the matrix comprises a non-ferromagnetic material that is non-ferromagnetic in a bulk state, and the portion comprises a ferromagnetic material and comprises substantially none of at least one of the at least one or more components.
2. The magnetic recording medium of claim 1, further comprising a second magnetic layer between the substrate and the first magnetic layer.
3. The magnetic recording medium of claim 2, wherein the matrix comprises Cr and the portion comprises less than 5 atomic percent Cr.
4. The magnetic recording medium of claim 3, wherein the matrix comprises at least 15 atomic percent Cr.
5. The magnetic recording medium of claim 2, wherein the first magnetic layer has $M_s > 400$ emu/cc and $H_c > 3,000$ Oe.

6. The magnetic recording medium of claim 2, wherein a difference in Ms of the first and second magnetic layers is greater than 100 emu/cc.

7. The magnetic recording medium of claim 2, wherein the portion is a discrete particulate region comprising particles or a co-continuous region.

8. The magnetic recording medium of claim 7, wherein there is substantially no magnetic exchange coupling between the particles.

9. The magnetic recording medium of claim 7, wherein the particles have a mean average particle size of less than 15 nm.

10. The magnetic recording medium of claim 7, wherein a difference in Ms of the first magnetic layer and of another layer is greater than 100 emu/cc, wherein the another layer is the first magnetic layer except the particles of the another layer contain an average concentration of Cr of greater than 5 atomic percent.

11. A method of manufacturing a magnetic recording medium comprising obtaining a substrate and preparing a first magnetic layer on the substrate, wherein the first magnetic layer comprises (a) a continuous matrix comprising at least one or more components and (b) a portion that is different from the matrix, the matrix

comprises a non-ferromagnetic material that is non-ferromagnetic in a bulk state, and the portion comprises a ferromagnetic material and comprises substantially none of at least one of the at least one or more components.

12. The method of claim 11, further comprising depositing a second magnetic layer.

13. The method of claim 11, wherein the preparing a first magnetic layer comprises depositing a magnetic layer and depositing a non-ferromagnetic material-containing layer.

14. The method of claim 13, wherein the preparing a first magnetic layer further comprises annealing the magnetic layer and the non-ferromagnetic material-containing layer.

15. The method of claim 13, wherein the magnetic layer and the non-ferromagnetic material-containing layer are about 5-25Å and 1-10Å thick, respectively.

16. The method of claim 14, wherein the annealing forms the matrix.

17. The method of claim 16, wherein a spacing between adjacent particles of the ferromagnetic particles is less than 5 nm.

18. A method of manufacturing a recording medium comprising depositing a second magnetic layer comprising grains of a ferromagnetic material separated by regions of a non-ferromagnetic material, depositing an intermediate layer on the second magnetic layer, depositing a top layer comprising a top layer material on the intermediate layer, annealing the intermediate layer and the top layer to cause migration of at least some of the top layer material into the intermediate layer and transforming the intermediate layer into a first magnetic layer containing co-continuous or discrete regions of ferromagnetic material including substantially no top layer material and containing regions of non-ferromagnetic material including top layer material.

19. The method of claim 18, wherein the intermediate layer has a substantially similar composition as that of the first magnetic layer but contains substantially no Cr or B, and the top layer material comprises Cr or a Cr-containing alloy.

20. The method of claim 18, wherein the first magnetic layer contains co-continuous or discrete regions of ferromagnetic material including substantially no

non-ferromagnetic material from the second magnetic and contains regions of non-ferromagnetic material including non-ferromagnetic material from the second magnetic layer.